

# Claims

- [c1] A sensing system for a vehicle comprising:  
a single vision sensor having a position on the vehicle,  
detecting at least one object, and generating at least one  
object detection signal; and  
a controller coupled to said vision sensor and generating  
a safety system signal in response to said position and  
said at least one object detection signal.
- [c2] A system as in claim 1 wherein said single vision sensor  
is a single two-dimensional vision sensor.
- [c3] A system as in claim 1 wherein said single vision sensor  
is a vision sensor selected from one of a camera, a  
charged coupled device, an infrared detector, a sensor  
having at least one photodiode, and a complementary  
metal-oxide semiconductor.
- [c4] A system as in claim 1 wherein said controller performs  
an adaptive cruise control task in response to said safety  
system signal.
- [c5] A system as in claim 1 wherein said controller deter-  
mines position of said single vision sensor relative to a  
predetermined reference on the vehicle.

- [c6] A system as in claim 1 wherein said controller determines position of said single vision sensor relative to a hoodline of the vehicle.
- [c7] A system as in claim 1 wherein said controller determines size and up-angle of said at least one object and in response thereto determines range of said at least one object.
- [c8] A system as in claim 1 further comprising a memory coupled to said controller and storing a predetermined position of said single vision sensor.
- [c9] A method of performing safety system operations within a vehicle comprising:
  - determining position of a single vision sensor on the vehicle;
  - detecting at least one object with said single vision sensor and generating at least one object detection signal;
  - and
  - generating a safety system signal in response to said determined position and said at least one object detection signal.
- [c10] A method as in claim 9 wherein determining position of a single vision sensor comprises:
  - determining distance between the single vision sensor

and a reference on the vehicle; and  
determining relative vertical positioning of said single vision sensor relative to said reference.

- [c11] A method as in claim 9 further comprising:  
initially as an assumed default, determining said at least one object to be at a same elevation as the vehicle; and  
generating said object detection signal in response to said initial determination.
- [c12] A method as in claim 9 further comprising reducing traveling speed of said at least one detected object when height and width of said object appear to increase in size.
- [c13] A method as in claim 9 further comprising determining said at least one object to be at a different elevation than the vehicle when said at least one object appears to maintain a same height and width, but change in vertical position.
- [c14] A method as in claim 9 further comprising determining object parameters and generating said safety system signal in response to said object parameters.
- [c15] A method as in claim 14 wherein determining object parameters comprise determining up-angle of said detected object.

- [c16] A method as in claim 14 wherein determining object parameters comprises determining size and up-angle of said at least one object and in response thereto determining range of said at least one object.
- [c17] A method as in claim 14 wherein determining object parameters comprises determining at least one parameter selected from object range, range rate, height, width, size, and acceleration.
- [c18] A method as in claim 9 wherein generating a safety system signal comprises generating an adaptive cruise control signal.
- [c19] A method as in claim 9 further comprising determining orientation of said single vision sensor and generating said safety system signal in response to said orientation.
- [c20] An adaptive cruise control system for a vehicle comprising:  
a single vision sensor having a position on the vehicle, detecting at least one object, and generating at least one object detection signal; and  
a controller coupled to said vision sensor, determining size and up-angle of said at least one object in response to said position and said at least one object detection signal, and in response thereto determining range of

said at least one object;

wherein said controller reduces speed of the vehicle in response to said range.